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ARTIFICIALLY PRODUCED RESISTANCE IN THE TRICHOPHYTON GYPSEUM IN THE PRESENCE OF UNDECYLENIC ACID AND IN THE PRESENCE OF SOME VEGETABLE ESSENCES*

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In a preliminary short report, J. C. Murphy and S. Rothman (1) demonstrated the possibility of *attaining a habituation* in the Trichophyton gypseum to grow in media which contained progressively larger quantities of pelargonic acid.

The results obtained by these authors induced us to make a test with the same fungus in the presence of undecylenic acid and, in the presence of some other vegetable essences, the fungicidic power of which has been demonstrated by us (2). The purpose of this investigation was to ascertain with which of these substances the habituation would be most difficult.

On the other hand, simultaneously with the research carried out with a Trichophyton gypseum isolated from a case of trichophytia of the trunk (Trichophyton gypseum 16 VC), we carried out an investigation with another strain of the same (Trichophyton gypseum interdigitalis 15 VC), isolated from mycotic intertrigo of the feet, all for the purpose of verifying whether the first species, which was present at a site of the skin containing abundant sebaceous glands, presented any greater resistance than the other strain which was found only in a single region, such as the interdigital spaces of the feet, in which the quantity of fatty fungicidic acids is smaller than at other areas of the skin surface.

Experimental

For the study of the habituation in the presence of undecylenic acid we employed, as has been stated, two strains of Trichophyton gypseum, those of the 16 VC and 15 VC. Both had been passed 20 and 19 months, respectively, through Sabouraud's glucosed and peptonated agar.

Particles of the fungus measuring approximately 1 cubic millimeter were introduced in Erlenmeyer's flasks containing 20 cc. of glucosed and peptonated broth (of 40 and 10 per cent, respectively). Progressively larger quantities of undecylenic acid were added to the flasks. These cultures were kept at the laboratory's temperature and efforts were made to agitate them as frequently as possible for the purpose of attaining the most intimate contact between the liquid and the fungus.

The results are indicated in the following table:

	PERIOD OF TIME DURING WHICH CONTACT WAS MAINTAINED	GROWTH UP TO A MAXIMUM CONCENTRATION OF UNDECYLENIC ACID	
		(Trichophyton gypseum 16 VC)	(Trichophyton gypseum interdigitalis 15 VC)
First growth.....	1 month	1/8000	1/13000
Second transplant.....	15 days	1/4000	1/5000
Third transplant.....	15 days	1/2800	1/3300
Fourth transplant.....	15 days	1/1800	1/2000
Fifth transplant.....	5 days	Unsuccessful in making them develop in larger concentrations (1/16:00–1/1000). Controls+++	

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For the study of the habituation in presence of the vegetable essences, an identical experimental device was used, the test being performed with geraniol, citral and eugenol, as they were considered the essences possessing the greatest fungicidal activity. The results are indicated as follows:

		TRICHOPHYTON GYPSEUM 16 VC		
		Geraniol	Citral	Eugenol
First growth.....	1 month	1/10000	1/10000	1/13300
Second transplant...	15 days	1/5700	1/4400	Did not grow to larger concentrations.
Third transplant....	15 days	Did not grow to greater concentrations. Controls: +++		

Conclusion

From the foregoing it can be concluded that: 1) it is possible to induce habituation of the Trichophyton gypseum in the presence of undecylenic acid; 2) that, as observed by Murphy and Rothman, if it is true that in the first growth the difference is most marked between a Trichophyton gypseum of interdigitalis origin and a Trichophyton that is not of such origin, demonstrating that in the latter there already exists a spontaneous adaptation to the toleration of greater concentrations of undecylenic acid than in the interdigitalic Trichophyton gypseum, then it is apparent that at the conclusion of the five passes the tolerance acquired by this last enables them to admit very similar quantities of fatty acid; 3) that it is much more difficult to attain habituation with vegetable essences, as is evident from the failure with one of them (eugenol), which is precisely the one possessing the most constant fungicidal action.

REFERENCES

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